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WINTER INJURY ON WOODY ORNAMENTALS

Weather conditions during the past few winters in Connecticut have been conducive for plant injury. The impact of these conditions is evident in ornamental plantings in the landscape as well as in woodlands throughout the state. The factors that cause this type of injury are diverse and problems often don't appear on woody ornamentals until the spring and summer. In addition, the extent and severity of the injuries that develop are often more extreme on plants weakened from drought stress.

Winter injury results from many environmental factors which have little in common other than they occur during the winter. Examples of these diverse factors include late spring frosts, cool summers followed by warm autumns and sudden drops in temperature, dramatic temperature fluctuations, freeze-thaw cycles, lack of snow cover, unusually warm mid-winter temperatures, extended periods of extreme or abnormally cold temperatures, and drying winds. For example, when freezing conditions follow a gradual drop in temperature, they are seldom harmful to most woody ornamentals provided the tissues are mature and have started to go dormant. However, if plant tissues are not mature or have not entered dormancy, they are unable to withstand freezing conditions and injury results. The injury is often confined to the immature, succulent shoots and the damage appears as a dieback of the terminals once growth begins in the spring.

Winter injury is important in and of itself but it also predisposes and weakens plants and subsequently makes them more vulnerable to secondary or opportunistic pests. Among these secondary problems are unusually high incidences of branch and twig diebacks such as those caused by *Botryosphaeria* spp. and *Phomopsis* spp., fungi which are normally not considered to be aggressive pathogens. Another important characteristic of winter injury is that quite often the symptoms are not evident until sometime **after** the injury has occurred. This can make accurate diagnosis very difficult. For example, winter damage to sapwood of lilacs may not be evident until spring or early summer when branches suddenly collapse and die.

Winter injury can occur on a wide range of plants. However, it is often particularly problematic on evergreens in the landscape. This includes broadleaved evergreens such as rhododendron, mountain laurel, and holly and needled evergreens such as hemlock, arborvitae, chamaecyparis, pine, and juniper. Deciduous trees and shrubs such as flowering cherry and almond, maple, and dogwood are also damaged by winter injury as are ground covers such as ivy and pachysandra.

SYMPTOMS:

Symptoms of winter injury are quite variable and depend upon the type of plant. Woody plants that are damaged by winter injury will often show tip and branch dieback, foliar browning, sunscalding, and bark splitting. One type of winter injury is excessive drying. This is quite common on evergreens and results from factors that create a water deficit in a plant. This type of injury occurs when water evaporates from leaves or needles on windy or warm sunny days during the winter or early spring. Drying occurs because this water is not replaced since the roots cannot take up enough water from cold or frozen soil. On broadleaved evergreens such as rhododendron and mountain laurel, the most familiar leaf symptom is characterized by a marginal browning and longitudinal rolling along the mid-vein. In some cases, entire branches or shrubs can be affected. Needled evergreens exhibit a slightly different symptom with browning of the tips or center portions of needles, chlorotic flecking, needle drop, and tip and twig dieback. In extreme cases, an entire shrub or tree may turn brown or appear off-colored.

On deciduous trees and shrubs, bark may be injured or split by cold weather. Cracks and dead areas appear in the bark and the bark begins to peel away from the trunk as the tree grows in spring and summer. This type of damage is common on many of the thin-barked species such as crabapples, cherries, and maples. Frost cracks during dormancy result from the expansion and shrinkage of bark and wood which causes internal mechanical stress and cracking and splitting of wood and slipping of bark at the cambium layer. Extremely cold winter temperatures also result in damage to flower and leaf buds. Buds can also be damaged by periods of unusually warm winter temperatures which trigger them to begin to break dormancy. When the normal temperatures return, these tender buds are injured. As a consequence of both types of injury, deciduous trees and shrubs may not flower or may fail to leaf out properly in the spring. Cold temperatures occasionally cause sub-lethal or lethal damage to cambial tissues. This type of injury usually doesn't appear early in the season but causes new branches to suddenly wilt and begin to die back by early to mid-summer. Injured tissues apparently cannot keep up with the water demands of actively growing plants and the plants collapse.

STRATEGIES FOR CONTROL:

Although the weather can't be controlled and there are no "cures" once the damage is done, there are steps that can minimize the effects of winter injury. These include:

- select the appropriate site for planting and use sound cultural practices to maintain vigor;
- select native plants or match plants to the site; for example, avoid planting broadleaved evergreens in open, windy locations where they will be subjected to drying winter winds;
- have sufficient moisture in the root zone before the soil freezes- this can be accomplished by giving the shrubs (esp. evergreens) a deep watering before the ground freezes in the fall; mulching also helps to increase moisture retention in the winter;
- avoid late summer and early fall fertilization- this stimulates and encourages growth late in the season which may not harden-off properly for the winter;
- prune and remove any dead twigs or branches which can serve as sites for secondary invaders or opportunistic pests;
- provide physical protection from water loss and drying winds- this is especially important for new transplants or plants in exposed locations; burlap wraps and sprays of anti-transpirants can be used;

February 2003 (revised)